DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION
ENVIRONMENTAL PROTECTION

ROUTINE INVESTIGATION REPORT

INSPECTION LOG #: 16-0422
SOURCE NAME: Bridgeport Biodiesel, LLC & Bridgeport Biodiesel 2 LLC
SOURCE ADDRESS: 146 Andover St, Bridgeport
SOURCE CONTACTS: Brent Baker, Operations Director of Bridgeport Biodiesel, LLC
CEO of Bridgeport Biodiesel 2 LLC
E-MAIL ADDRESS: brent@ctbiofuels.com

BACKGROUND:

DATE: June 20, 2016 **TIME:** 9:00AM – 11:30AM

OBJECTIVE: Determine both Bridgeport Biodiesel, LLC (BB1) and Bridgeport Biodiesel 2 LLC (BB2)'s potential emissions.

WEATHER CONDITIONS:

OBSERVATIONS: Mark Potash and I arrived in the area of 146 Andover Street at approximately 9:00AM. We observed the activities and equipment at the site by walking around the building where BB1 and BB2 are housed. Both are located in the same building, in separate bays and separated by a wall. We observed multiple storage tanks located on the southeast side of the building. Mr. Brent Baker, Operations Director of BB1 and CEO of BB2, met us to give us a tour of both processes shortly after we announced our presence to employees at the facility. (**Attachment A**)

Brideport Biodiesel, LLC (BB1)

BB1 is a 500-gal batch biodiesel manufacturing process and is currently owned by LARD-NABF, LLC (75%) and The Sustainable Biodiesel Company LLC (25%). BB1 was not built by either of the companies that are now involved in its operation. Mr. Baker stated that the plant is rated at 1.3 million gallons, theoretically, which is about 80,000 gal of biodiesel production per month. However, the plant has never been able to produce biodiesel at that rate. Mr. Baker stated biodiesel had been produced at the facility from 2010 through mid-2015 and has not been produced since then. Used oil collection and settling is the only process currently occurring at BB1. The used oil is either being transferred out by truck as feedstock for other biodiesel plants or being stockpiled for future processing. There are 3 used cooking oil, 3 sodium methylate and/or methanol, and 3 wash tanks within the BB1 facility.

The process used to produce biodiesel at BB1 is as follows: Used oil is collected from the tri-state area. The used cooking oil is allowed to settle to remove solids, then the oil is tested for free fatty acid (FFA) content and moisture. No chemical pretreatment (esterification with an acid catalyst) is performed at BB1. After the used cooking oil is FFA and moisture tested, the oil moves on to the transesterification reactor which combines and mixes the reactants, used cooking oil and methanol, with the catalyst, sodium methoxide in solution with methanol (sodium methylate), for 1 hr at a temperature of 212°F. The total volume of reactants added to the transesterification reactor is 637 gal. Methanol emissions from the tranesterification process are controlled using a condenser (maintained at 60°F) and a carbon drum which vents to the atmosphere. After the reaction, the product, biodiesel, is separated from the coproduct, a solution of glycerol, unreacted methanol, and catalyst. The biodiesel is washed for 4 hr using water, is air-dried, and is then ASTM tested before being sold. The glycerol solution coproduct is sold to other companies. BB1 does not have a way to distill the unreacted methanol out of the glycerol. Mr. Baker stated that during an 8-hr shift, the

most biodiesel that the BB1 has processed is approximately 3,000 gal. Mr. Baker stated that nitrogen blankets are used in the storage tanks and the transesterification reactor in order to reduce methanol emissions.

BB1 has previously submitted potential emission calculations performed by Lutros, LLC to the department. The potential emission calculations focused on methanol, which is a hazardous air pollutant. There were 4 main sources of methanol emissions identified:

1. Storage tank emissions – 0.26 TPY – Potential emissions were calculated using AP 42 – Organic Liquid Storage Tanks (Section 7). (**Attachment B**)
2. Fugitive emissions from equipment leaks – 0.93 TPY – Potential emissions were calculated using SOCMI average emission factors for polymer and resin manufacturing. (**Attachment B**)
3. Transesterification reactor process – 1.73 TPY – Potential emissions were calculated using ideal gas law relationships. (**Attachment B & C**)
4. Water wash process – 4.24 TPY – Potential emissions were calculated using ideal gas law relationships. (**Attachment B & C**)

Therefore, Lutros, LLC claims that the total potential methanol emissions of BB1 are 7.16 TPY.

Bridgeport Biodiesel 2 LLC (BB2)

BB2 is a continuous biodiesel manufacturing process with a theoretical annual capacity of 13.1 million gallons of biodiesel per year. Mr. Baker stated that 90% of BB2 is owned by The Sustainable Biodiesel Company, LLC and LARD-NABF, LLC is not involved with BB2. The production facility has not yet produced any biodiesel. During our inspection, BB2 was undergoing commissioning activities, and Mr. Baker stated that he hoped the first batch of biodiesel would be produced within a few days.

The BB2 biodiesel production process is vastly different than that of BB1. The main difference lies in the production types (continuous versus batch). When BB2 is commissioned and at steady-state, the production process is continuous, so all processes will be automated. Unlike BB1, BB2 does pretreat the cooking oil feedstock using a solid, reusable catalyst instead of the traditional acid catalyzed esterification pretreatment reaction. Methanol emissions are controlled throughout the entire process using a vacuum system and a condenser. The BB2 process also recovers unreacted methanol from the glycerol coproduct stream using a distillation process.

According to Mr. Baker, the tank farm observed during the initial walk-around is owned by BB2. Each tank is equipped with pressure relief valves with a setting of 1 lb, and are nitrogen blanketed. The following are the sizes and contents of each of the tanks in the farm:

Tank Size (gal)	Tanks Contents
18,000	Glycerin
28,000	Cooking oil
30,000	Cooking oil
30,000	Biodiesel
28,000	Biodiesel
18,000	Biodiesel
8,000	Sodium methylate
5,000	Methanol
5,000	Methanol

BB1 is located between BB2 and the tank farm, so a pipe bridge runs through BB1 in order to transfer feedstock and products between the tank farm and BB2. In addition to the biodiesel production process equipment in BB2, BB2 also has 2 - 8 MMBtu/hr, natural gas fired boilers to produce steam for the production process, a chiller to provide cold water to the condensers, and a nitrogen tank for blanketing. Mr. Baker stated that BB1 also uses nitrogen and steam from the equipment located in

BB2.

Potential emission calculations for BB2 have also previously been submitted to the Department. The potential emission calculations were calculated by Lutros, LLC and focused on methanol, a hazardous air pollutant. There were 5 main sources of methanol emissions identified:

1. Storage tank emissions – 0.85 TPY – Potential emissions were calculated using AP 42 – Organic Liquid Storage Tanks (Section 7). (**Attachment D**)
2. Fugitive emissions from equipment leaks – 5.84 TPY – Potential emissions were calculated using SOCMI average emission factors for polymer and resin manufacturing. (**Attachment D**)
3. Vacuum system exhaust – 0.58 TPY – Potential emissions were calculated using ideal gas law relationships. *Lutros does NOT consider the vacuum system condenser to be a control device* as outlined on Page 9 of **Attachment D**. (**Attachment D & C**)
4. Process Tanks Cycling – 0.09 TPY – Potential emissions were calculated using ideal gas law relationships and assuming the tanks are cycled once per month for maintenance purposes. (**Attachment D & C**)
5. Methanol Distillation Cycling – 0.02 TPY – Potential emissions were calculated using ideal gas law relationships and assuming distillation of methanol occurs once per week. (**Attachment D & C**)

Therefore, Lutros, LLC claims that the total potential methanol emissions of BB2 are 7.37 TPY.

Common Control Determination

During this review, we were also interested in determining if BB1 and BB2 are under common control. The following is information gathered through the site inspection and from Brent Baker's written response to common control questions (**Attachment E**):

- BB1 and BB2 share the same address and are located in the same building in adjacent garage bays, separated by a wall.

BB2's

BB2 **BB2** **BB1** **BB1**

- BB1 and BB2 would be classified under the same SIC code (2869 or 289 were suggested by Mr. Baker in response to the common control questions).
- Brent Baker is heavily involved with the operation of both facilities. During the tour he identified himself as the CEO of both BB1 and BB2, and when responding to the common

control questions identified himself as the Operations Director of BB1 and the CEO of BB2.

- The entry for BB2 in CT's Commercial Recording Division database (CONCORD) identifies the "Agent" of BB2 is BB1 (**Attachment F**).
- According to Mr. Baker, BB2 owns the tank farm located on the southeast side of the building. The piping that supplies reactants from and returns products to BB2 physically runs through BB1. Both BB1 and BB2 have the ability to draw feedstock from these storage tanks.
- BB2 and BB1 both share steam (produced from boilers owned by BB2) and nitrogen used to blanket tanks.

Questions for EPA:

- Are BB1 and BB2 under common control?
- Does the EPA agree with Lutros' assertion that the condenser associated with the vacuum system is NOT a control device?
- Can EPA provide any guidance on how other biodiesel companies have calculated potential emissions – particularly for the processing methanol emissions? How does Lutros' calculation approach compare to other's?

RECOMMENDATIONS:

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Alyssa Park #278